DOCUMENT RESUME

ED 348 363 SP 034 014

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TITLE Teaching To Learn: Cross-Age Tutoring To Enhance Strategy Acquisition.
PUB DATE Apr 92
NOTE 15p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 20-24, 1992).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *Cross Age Teaching; Elementary Secondary Education; *Experiential Learning; Learning Activities; *Learning Strategies; Outcomes of Education; Story Grammar; *Tutors
IDENTIFIERS *Impact Evaluation; *Learning through Teaching

ABSTRACT

This study was conducted to examine tutoring as a pedagogical tool to enhance learning in the tutor. Three groups of high school students were subjects of the study. The first group, instructed in a story grammar and its use as a recall apparatus, taught the strategy to younger students; the second, an equivalent group, was given strategy instruction but did not teach it; and the third, a control group, neither received strategy instruction nor taught others. After practicing teaching each other during two lessons, the members of the tutoring group spent 6 weeks teaching the strategy twice a week to fourth and fifth graders. During the same period and on the same schedule, the strategy group reviewed the story grammar and practiced its use as a recall apparatus using materials in their normal curriculum. The control group continued in the normal curriculum (a mixture of lessons, mostly vocabulary and grammar). Before and after the 9-week instruction and practice period, all three groups were tested on their knowledge of story grammer and its mnemonic utility. Results indicate significant differences in strategy learning between the tutoring group and the strategy and control groups. The tutoring group appeared to have learned the strategy better than both strategy and comparison groups. (LL)

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ED348363

Teaching to Learn

Cross-Age Tutoring to Enhance Strategy Acquisition

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Abstract

The instructional effectiveness of tutoring on the tutee is widely documented and in daily classroom use. Tutoring to enhance learning in the tutor may be an equally important pedagogical tool. This study explored the effectiveness of teaching to learn: whether high school students instructed in a story grammar and its use as a recall apparatus who then taught this strategy to younger students learned the strategy better than an equivalent group who were given strategy instruction but did not teach it, and a comparison group who neither received strategy instruction nor taught the strategy to others.

The tutoring and strategy groups were given five lessons on the structure of the story while the comparison group continued their normal curriculum (a mixture of lessons, mostly vocabulary and grammar). The tutoring group practiced teaching each other during two lessons. Then, twice a week for six weeks, each member of the group taught the strategy and its use as an aid to recall to a fourth or fifth grader using intermediate trade books. During the same period and on the same schedule as the tutoring group, the strategy group reviewed the story grammar and practiced its use as a recall apparatus using materials in their normal curriculum. The comparison group continued as before.

Both before and after the nine-week instruction and practice period, all three groups were tested on their knowledge of the story grammar and its mnemonic utility. Analysis of covariance using IQ and pretest scores as covariates indicated that there were significant differences between the tutoring group and both the strategy and comparison groups, and no significant differences between the strategy and comparison groups. The tutoring group appeared to have learned the strategy better than both strategy and comparison groups.

These results suggest that strategy instruction alone may not be sufficient for some students to learn what they are taught, and that strategy instruction combined with teaching that strategy to someone else may be efficacious for such students.

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Background of the Study

Cross-Age Tutoring

Because it is as natural as are sibling relationships, cross-age tutoring is a commonly-used teaching method. Cross-age tutoring enables teachers to individualize instruction (Bohning, 1982), and provides peer links between teacher and students (Myrick & Bowman, 1983). It makes efficient use of available personnel (Howard, 1977); it serves content area acquisition goals (Miller, 1989); and it is eminently cost-effective (Levin, Glass & Meister, 1984).

Much recent cross-age tutoring research has examined the reading achievement of tutees, ranging from the phonics improvement of a first grade non-reader (Wasserman & Stanbrook, 1981); to enhanced oral reading accuracy by second, third, and fourth graders (Trovato & Bucher, 1980); and a four-fold increase in accuracy and comprehension in six-year-old to eight-year-old children (Limbrick, McNaughton & Glynn, 1985).

Other studies have shown that cross-age tutoring enhances the reading achievement of the tutors. Gibbs (1982) cites several studies in which gains in oral reading, word recognition, and general reading performance were made by upper-grade elementary tutors. Other findings have chronicled the improved reading achievement of three under-achieving third graders who taught three primary students (Limbrick, et al., 1985), and fifth graders who taught sight words to first graders (Robertson & Sharp, 1971).

It is notable, however, that cross-age tutoring programs involving high school students as tutors have not been concerned with the tutors' reading achievement. Instead, such programs have dealt with drop-out prevention (Sosa, 1986); amelioration of truancy and tardiness rates (Lazerson, Foster, Brown & Hummel, 1988); general scholastic improvement by handicapped students (Maher, 1984); alternative English programs (Wheeler, 1983); and psychological factors such as altruism and empathy (Yogev & Ronen, 1982) or self-esteem and self-concept (Pino, 1990; Porter & Hamilton, 1975).

Strategy Instruction

One variable that has been found to be a powerful predictor of the recall of content is the pattern or structure of text (Mandler & Johnson, 1977; Stein, 1977). Understanding stories is the interaction between task demands, for example, recalling the content of a narrative; and available strategies, for example using story structure to enhance recall (Whaley, 1981). The use of a story grammar as recall strategy has been well documented in young children (Marshall, 1983; Page & Stewart, 1985; Turetzky, 1982), but less commonly explored in older students (Singer & Donlan, 1982).

Good strategy use is complex and thus requires detailed instructional sequences and extended practice. O'Sullivan and Pressley (1984) and Paris and Jacobs (1984) examined the relationship between metacognitive awareness of reading strategies and reading comprehension and suggested that teachers emphasize not only students' use of a particular reading strategy, but also their awareness of their use of it. Pressley, Goodchild, Fleet, Zajchowski, and Evans (1989) advocated systematic strategy instruction accompanied by adequate practice and efforts to help students become metacognitively aware of the utility of specific strategies. Hatano (1982) suggested that the durability of students' strategy knowledge is important, but that transfer of strategy use from one reading task to another may not be necessary. Students might more profitably be taught how to read fiction, for example, using a story structure strategy, and taught a different strategy for finding main ideas in expository text.

Cross-Age Tutoring and Strategy Instruction

Some researchers have argued that cross-age tutoring "could induce the subject-tutor to bring into focus metacognitive knowledge about a cognitive task demand (Hahn & Smith, 1983, p. 331), such as a reading strategy. In other words, tutors "become self-conscious about their strategies and objectives" (Flavell, 1976, p. 235) as they assume the role of the teacher. Indeed, Garner, Wagoner, and Smith (1983) suggested that "if the older readers ever scrutinize text as part of message processing, they should surely do so (and encourage another learner to do so) in this setting" (p. 441). It is this potential for metacognitive awareness that raises the question of whether cross-age tutoring might be an effective method of enhancing reading strategy acquisition.

Method

Three groups of students in equivalent tenth grade classrooms of low achievers constituted the study population: a strategy only group of 13 students, a strategy plus tutoring group of 14 students, and a comparison group of 13 students. In the two-week first phase of the study, the strategy only and the strategy plus tutoring groups were taught a story structure and its use as a recall apparatus. The comparison group was taught a mix of lessons, largely vocabulary and grammar, from their normal curriculum. In the seven-week second phase of the study, the strategy only group continued its practice of the story structure and its use as an aid to recall during twice-weekly lessons. After two lessons on how to tutor, the strategy plus tutoring group taught the story structure in two 30-minute lessons a week for six weeks to fourth and fifth grade children in a nearby elementary school. The comparison group continued the regular tenth grade curriculum in language and literature.

Because the groups in the study were intact classes to whom random assignment of treatment was impossible, initial group equivalence was examined across several variables: age, Otis-Lennon IQ, reading comprehension stanine from the Metropolitan Achievement Test, number of students with IEP's, gender, and program (general or vocational). No significant differences were found among the groups on any of these variables; as initially constituted, the groups appeared essentially similar. Table 1 summarizes estimates of group equivalence.

Non-random assignment of groups to teachers can confound results. Several measures were therefore taken to control for teacher differences. The investigator wrote all the lessons used during the study: the story grammar lessons taught to the strategy only and strategy plus tutoring groups during the first phase of the treatment, the literature, vocabulary and grammar lessons taught to the comparison group, the practice lessons taught to the strategy only group during the second phase of the treatment, and the tutoring lessons used by the tutoring group with their fourth and fifth grade reading partners.

The investigator (known to the students as a regular faculty member of the school) also taught all the lessons during the first phase of the treatment, doing so on the same days to all three groups. Further, the investigator observed each of the groups on the same days during the second phase of the treatment: the strategy only and comparison groups receiving instruction in their classrooms and the tutoring group teaching in the elementary school. Finally, the teachers of the three groups reported no appreciable deviation from the investigator-designed protocols for the second phase of the treatment. That is, the teacher of the strategy only group utilized the investigator's lessons twice a week and continued the regular curriculum the other three days, the teacher of the tutoring group supervised their tutoring twice a week and also continued the regular curriculum the other three days, and the teacher of the comparison group utilized the regular curriculum throughout the seven-week second phase of the study.

Data

All students were pretested on the story structure and its use as an aid to recall immediately prior to the first phase of the study, and posttested on the same instrument in the week following the completion of the second phase of the study, approximately nine weeks later. After the posttest, all students were also asked to list several things good readers do while they read.

There were 46 original participants, but six were dropped from the study before its conclusion. Three students in the comparison group were transferred to other schools or to other classes not in the study for reasons unrelated to instruction. Two students in the strategy plus tutoring group were dropped from the study because one was transferred to a special education placement and the other was returned to the ninth grade. The pretest

scores of the five dropouts were compared to those of the remaining students. No significant differences were found between their scores on the story grammar pretest and those of the study participants. There were no changes in the strategy only group, and no students were added to any of the three classes in the study.

The story structure test was based on the schemata summarized by Page and Stewart (1985) and Whaley (1981) and consisted of two short passages, an animal tale of approximately 350 words and a Greek myth of approximately 400 words; and a set of questions for each requiring a total of 29 answers. The questions focused on the elements of the story grammar the students had been taught: setting, main character, goal or problem of the main character, efforts the main character makes to reach the goal or solve the problem, the apparent conclusion of the story, and its unexpected (twist) ending. The test had a fifth grade readability as obtained by Fry's ratio of syllables to sentences in 100-word passages, and its face validity was evaluated by two teachers currently teaching story structure. The items on the test were field-tested for passage-dependency by asking students in a randomly selected basic English class in the same school as the study groups to complete the test questions without reading the stories or their titles. The students' general reaction was incredulity that they should even be expected to attempt responses in the absence of the text; none managed more than a single correct response, and most turned in blank papers.

Inter-item reliability was assessed at the time of pretest administration by means of a measure of internal consistency (split-half), yielding alpha coefficients of .82 and .84. The Spearman-Brown formula was applied to estimate the reliability of the complete test, providing a coefficient of .79 when all three treatment groups were combined. The group reliability coefficients ranged from .69 for the comparison group to .76 for the strategy plus tutoring group and .91 for the strategy only group.

One way analysis of covariance was used to evaluate the results of the study, using scores from the story structure test as the dependent variable. Because the groups initially differed on the dependent variable, pretest scores were used as a covariate. Another covariate, ability as measured by an Otis-Lennon IQ score, controlled for differential ability to respond to the treatment. The Tukey post-hoc test was used to evaluate differences between groups of equal size, and the Tukey-Kramer modification was used to evaluate differences between groups of unequal size. Table 2 summarizes the ANCOVA results.

Students' responses to the survey question were compiled by group in order to aid in the interpretation of the results of the ANCOVA procedure. Table 3 presents these responses in tabular form.

Results

Analysis of covariance indicated significant differences among groups. The Tukey post hoc tests determined that the tutoring plus strategy group was different from both the strategy only and the comparison groups, and that there were no significant differences between the strategy only and the comparison groups. That is, students who had been taught the story structure and its use as a recall apparatus and then tutored elementary students in the strategy did better on the test of story knowledge than did students who had been taught the story structure as a recall strategy but did not teach it, and students who had neither been taught the story structure as a recall strategy nor taught it to others.

The fact that the strategy plus tutoring group seemed to have learned the story structure as a reading strategy better than either of the other groups seems to indicate that it was not only strategy instruction which enabled them to do better on the story knowledge test, since the strategy only group received virtually identical instruction, but utilization of the strategy by teaching it to others.

A review of the students' responses to the question asking what good readers do seemed to indicate that the students in the strategy plus tutoring group were more aware of strategies used by good readers than were those in either the strategy only or the comparison groups. Tutors listed a variety of activities which revealed a detailed understanding of what good readers do, ranging from "ask questions" and "think about what you are reading" to "picture the scene while reading."

Discussion

The findings of this study seem to indicate that strategy instruction alone may not ensure students' acquisition of a reading strategy. In other words, there is a difference between knowing a strategy and using it. The mechanism by which students re-access what they have been taught is metacognitive in nature. That is, students know they have knowledge, in this instance about story structure. Both strategy only and strategy plus tutoring group students had knowledge of the strategy and also knew how it could be used to enhance recall. The strategy plus tutoring students also apparently had control over what they knew, which enabled them to use their knowledge of the story structure as an effective recall strategy. Cross-age tutoring seemed to help these students utilize the learned strategy to recall story elements.

That cross-age tutoring was effective in enabling students to recall significantly more story information suggests that tutoring programs might be used to enhance strategy instruction. Further, since elementary schools are not always conveniently located near secondary schools, cross-age tutoring programs within secondary schools might provide

similar opportunity for the development of metacognitive awareness as well as the insight, additional exposure to the material, or relearning suggested by Nevi (1983) as other reasons why students learn better when they teach others. Miller (1989), for example, found that 15-year-old fourth year physics students who tutored 12-year-old first year science students learned more than an equivalent group who did not tutor and felt they understood the work better.

In addition, the fact that cross-age tutoring seemed effective as a learning method when combined with strategy instruction suggests that peer tutoring might bring about similar results. An important advantage of peer tutoring is that it can take place within a classroom or between groups of same-age students, thus obviating the attendant difficulties of cross-age tutoring: establishing a working relationship with the staff and students of another school, scheduling, creating pairs, and moving students between schools. Peer tutoring does not, however, have the older-younger dynamic inherent in cross-age tutoring. There are also competence and competition issues within peer tutoring which would seem to come into play less frequently as the age gap between tutor and tutee widens. These are significant differences between the two modes of instruction which merit exploration.

Table 1

Initial Group Equivalence

variable	M	SD	F	F prob.
AGE				
comparison	15.8824	.9275		
strategy	15.3077	.4804		
tutoring	15.6875	.7042		
total	15.6522	.7664	2.2094	.1221
IQ (Otis-Lennon)				
comparison	88.7059	8.7233		
strategy	90.2308	7.2360		
tutoring	88.1878	6.3058		
total	88.9565	7.4146	.2785	.7583
GENDER (1=male, 2=female)				
comparison	1.4706	.5145	9 boys, 8 girls	
strategy	1.3846	.5064	8 boys, 5 girls	
tutoring	1.2500	.4472	12 boys, 4 girls	
total	1.3696	.4880	.8447	.4367
IEP (1=yes, 2=no)				
comparison	1.4118	.5073	10 no, 7 yes	
strategy	1.5385	.5189	6 no, 7 yes	
tutoring	1.5625	.5123	7 no, 9 yes	
total	1.5000	.5055	.4078	.6676

Table 1 cont'd

Initial Group Equivalence

variable	M	SD	F	F prob.
PROGRAM (1=vocational, 2=general)				
comparison	1.4706	.5145	9 voc, 8 gen	
strategy	1.4615	.5189	7 voc, 6 gen	
tutoring	1.4375	.5123	9 voc, 7 gen	
total	1.4565	.5035	.0179	.9823
READING STANINE				
comparison	2.8255	.7276		
strategy	2.5385	.8771		
tutoring	2.7500	.6831		
total	2.7174	.7502	.5438	.5845

Table 2

Analysis of Covariance of Posttest Scores
Story Grammar Test

group	observed mean	adjusted mean	F df 2,36	F prob.
comparison	39.786	41.180		
strategy	41.077	40.903		
tutoring	48.500	47.281	9.39	.001**

Post Hoc Analysis

groups	N	difference between means	critical value
tutoring	14		
comparison	14	6.101	1.820
tutoring	14		
strategy	13	6.378	1.889
strategy	13		
comparison	14	0.277	1.889

Table 3

Responses to Question: What Do Good Readers Do?

comparison[a]	strategy	tutoring
N=10[b]	N=5	N=12
take notes	keep quiet	ask questions
listen to music	focus on words (1)	look up words
talk about story after reading (3)	interested in story (2)	picture scene while reading (1)
let nothing interfere (2)		sound out words not known
analyze		look at pictures (3)
		think about what is read (2)
		express feelings
		focus on reading
		use finger to keep place
		read aloud very clearly
		pay attention to punctuation

[a] All students did not respond to the question; some gave more than one answer. Number in parentheses indicates number of responses in excess of one.

[b] N = number of students responding at least once.

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